

CLAIMS

1. A method for producing a signature on a DVD disc comprising:
partially disabling error correction prior to EFM+ encoding; and
introducing at least one ambiguous symbol into an ECC block during
5 EFM+ encoding.
2. The method according to claim 1, wherein introducing at least one
ambiguous symbol comprises:
selecting at least one byte in at least one column of the ECC block.
3. The method according to claim 2, wherein introducing at least one
10 ambiguous symbol further comprises:
encoding at least one data symbol in said column by the corresponding
ambiguous representation of said at least one data symbol.
4. The method according to claim 2, wherein partially disabling error
correction comprises:
15 invalidating at least one outer parity symbol (P0) of the 16 PO bytes
corresponding to the at least one column; and
invalidating at least one inner parity symbol (PI) of the 10 PI bytes
corresponding to each row containing one of the invalidated outer parity
symbols.
- 20 5. The method according to claim 4, wherein invalidating comprises:
invalidating the bits in said at least one outer parity symbol (P0) and said
at least one inner parity symbol (PI).
6. The method according to claim 2, wherein partially disabling error
correction comprises:
25 invalidating at least eight outer parity symbols (P0) of the 16 PO bytes
corresponding to the at least one column.

7. The method according to claim 6, wherein partially disabling error correction further comprises:

invalidating at least five inner parity symbols (PI) of the 10 PI bytes corresponding to each row containing one of the invalidated outer parity symbols.

8. The method according to claim 6, wherein invalidating comprises:

invalidating the bits in at least one of the at least eight outer parity symbols (P0).

9. The method according to claim 7, wherein invalidating comprises:

invalidating the bits in at least one of the at least five inner parity symbols (PI).

10. The method according to claim 6, wherein invalidating comprises:

substituting at least one of the at least eight outer parity symbols (P0) with a different symbol.

11. The method according to claim 7, wherein invalidating comprises:

substituting the bits in at least one of the at least five inner parity symbols (PI) with a different symbol.

12. A method for validating a signature on a DVD comprising:

comparing the number of reads for at least one unprocessed sector within the ECC block to be read correctly with the number of reads for at least one processed sector within said ECC block to be read correctly.

13. The method according to claim 12, wherein said comparing comprises:

pre-determining a maximum allowable number of reads,

reading the processed sector up to said maximum allowable number of reads or until successfully read;

comparing the number of reads of at least one unprocessed sector with the number of reads to successfully read of said at least one processed sector; and

if the number of reads for the processed sector is greater than the number of reads for an unprocessed sector then the signature is valid.

14. A method for validating a signature on a DVD comprising:
comparing the time to successfully read at least one unprocessed sector within the ECC block with the time to read at least one processed sector within said ECC block.

5 15. The method according to claim 14, wherein said comparing comprises:
reading said at least one processed sector until said at least one processed sector is successfully read or the reading of said at least one processed sector is timed out;
determining the time of reading said at least one processed sector; and
10 comparing the time to read at least one unprocessed sector with the time to successfully read said at least one processed sector.

16. A method for producing a signature on a digital optical disc (DVD) comprising:
altering at least one component in the lead-in zone of the DVD.

15 17. The method according to claim 16, wherein altering at least one component comprises:
changing the Burst Cutting Area (BCA) descriptor.

18. The method according to claim 17, wherein changing the BCA descriptor comprises:
20 setting the BCA descriptor to 0x80.

19. The method according to claim 16, wherein altering at least one component comprises:
changing the Disc manufacturing information (DMI).

20. The method according to claim 19, wherein changing the DMI comprises:
25 placing the DMI in one of a group of bytes including 0x01, 0x08, 0x10 and 0x80.

21. A method for producing a signature on a digital optical disc (DVD) comprising:
altering at least one sector in the data zone of the DVD so that said at
30 least one sector is generally unreadable.

22. The method according to claim 21, wherein altering at least one sector comprises:

altering the contents of the sector header.

23. The method according to claim 22, wherein altering at least one sector
5 comprises:

altering at least one of a group including the ID (Identification Data), IED
(ID Error Detection Code) and CPR_MAI (Copyright Management Information).

24. The method according to claim 21, wherein altering at least one sector
comprises:

10 altering the IED according to the ID;
computing the EDC according the ID and the altered ID; and
altering the computed EDC.

25. The method according to claim 21, wherein altering at least one sector
comprises:

15 after computing the EDC, altering at least one byte of the main data.

26. The method according to claim 21, wherein altering at least one sector
comprises:

after computing the EDC, altering the computed EDC.

27. A method for producing a signature on a digital optical disc (DVD)
20 comprising:

appending or replacing at least one sector in the data zone of the DVD;
and

amending said at least one sector in the data zone of the DVD so that
said at least one sector is generally unreadable.

25 28. The method according to claim 27, further comprising:

altering the contents of the sector header in the appended or replaced at
least one sector.

29. The method according to claim 28, wherein altering at least one sector comprises:

altering at least one of a group including the ID (Identification Data), IED (ID Error Detection Code) and CPR_MAI (Copyright Management Information).

5 30. The method according to claim 27, wherein altering at least one sector comprises:

altering the IED according to the ID;

computing the EDC according the ID and the altered ID; and

altering the computed EDC.

10 31. The method according to claim 27, wherein altering at least one sector comprises:

after computing the EDC, altering at least one byte of the main data.

32. The method according to claim 27, wherein altering at least one sector comprises:

15 after computing the EDC, altering the computed EDC.

33. A method for producing a signature on a digital optical disc (DVD) comprising:

generating at least one sector, each of said at least one sectors requiring at least two read operations to be read correctly.

20 34. The method according to claim 33, wherein said generating comprises: partially disabling error correction prior to EFM+ encoding; and introducing at least one ambiguous symbol into an ECC block during EFM+ encoding.

35. The method according to claim 33, wherein at least one ambiguous
25 symbol comprises:

selecting at least one byte in at least one column of the ECC block.

36. The method according to claim 35, wherein at least one ambiguous symbol further comprises:

30 encoding at least one data symbol in said column by the corresponding ambiguous representation of said at least one data symbol.

37. The method according to claim 35, wherein partially disabling error correction comprises:

invalidating at least one outer parity symbol (P0) of the 16 PO bytes corresponding to the at least one column; and

5 invalidating at least one inner parity symbol (PI) of the 10 PI bytes corresponding to each row containing one of the invalidated outer parity symbols.

38. The method according to claim 37, wherein invalidating comprises:

10 invalidating the sequence of bits in said at least one outer parity symbol (P0) and said at least one inner parity symbol (PI).

39. A table for converting 8-bit coded data into 16-bit code words, comprising:
at least one 16-bit code word generally capable of being read in one of at least two possible ways.

40. The table according to claim 39, wherein said at least one 16-bit code word comprises:

at least one transition, said at least one transition being shifted between a pair of encodings differing by one transition position.

41. The table according to claim 39, further comprising:

20 a plurality of states, each of said plurality of states having at least one 16-bit code word capable of being read in one of two possible ways

42. A table for use with an EFM+ encoder comprising:

means for converting 8-bit coded data into 16-bit code words, at least one 16-bit code word generally capable of being read in one of at least two possible ways.

25 43. The table according to claim 42, wherein said at least one 16-bit code word comprises:

at least one transition; and

means for shifting said at least one transition between a pair of encodings differing by one transition position.

44. A DVD encoder comprising:
a non-standard sector generator.

45. The DVD encoder according to claim 44 wherein said non-standard sector generator comprises at least one of a group including a sector header modifier, an EDC modifier.

46. The DVD encoder according to claim 45 wherein said sector header modifier comprises at least one of a group including an ID (Identification Data) modifier, an IED (ID Error Detection Code) modifier and a CPR_MAI (Copyright Management Information) modifier.

10 47. A DVD encoder comprising;
an error correction disabler; and
an ambiguous symbol generator.

48. The DVD encoder according to claim 47 wherein said an error correction disabler comprises:

15 an ECC block number selector;
 a row and column number selector; and
 an address comparator in communication with said ECC block number
 selector and said row and column number selector.

49. The DVD encoder according to claim 47 wherein said ambiguous symbol
20 generator comprises:

standard main conversion and substitution tables;
at least one table of ambiguous symbols; and
a selector in communication with said standard main conversion and
substitution tables and said at least one table of ambiguous symbols, said
25 selector determining which of said standard main conversion and substitution
tables and said at least one table of ambiguous symbols to use for encoding at
least one data symbol.

50. A DVD encoder comprising:
an ECC block invalidator.

51. The DVD encoder according to claim 50 wherein said ECC block invalidator comprises:

- an outer parity symbols (P0) invalidator;
- an inner parity symbols (PI) invalidator; and
- a data symbol replacer.

52. A DVD encoder comprising:

- an invalid Reed-Solomon parity symbol generator.

53. A DVD disc comprising:

- at least one sector, configured to require at least two read operations to be read correctly.

54. A DVD disc comprising:

- a signature, said signature having at least one ambiguity resulting from at least one ambiguous symbol inserted into an ECC block. during EFM+ encoding and having partially disabled error correction, said partially disabled error correction being produced prior to EFM+ encoding.

55. The DVD disc according to claim 54, wherein said at least one ambiguous symbol comprises:

- at least one encoded data symbol in at least one byte in at least one column of the ECC block, said at least one encoded data symbol being the corresponding ambiguous representation of said at least one data symbol.

56. The DVD disc according to claim 54, wherein said partially disabled error correction comprises:

- at least one invalid outer parity symbol (P0); and
- at least one invalid inner parity symbol (PI).

57. The DVD disc according to claim 54, wherein said partially disabled error correction further comprises:

- at least one substituted outer parity symbols (P0); and
- at least one substituted inner parity symbol (PI).

58. The DVD disc according to claim 54, wherein said signature is validatable by requiring a greater number of reads for a processed sector on the disc than the number of reads for an unprocessed sector.

59. The DVD disc according to claim 54, wherein said signature is validatable
5 by requiring a pre-determined time to be read.

60. A DVD disc comprising:

means for producing a signature on a DVD disc, said signature comprising:

means for partially disabling error correction prior to EFM+ encoding;

10 and

means for introducing at least one ambiguous symbol into an ECC block during EFM+ encoding.

61. A DVD disc comprising:

15 a signature having at least one altered component in the lead-in zone of the DVD.

62. A DVD disc comprising:

at least one altered sector in the data zone of the DVD said at least one sector being generally unreadable.

63. A DVD disc comprising:

20 at least one appended or replaced sector in the data zone of the DVD;
and

at least one amended sector in the data zone of the DVD, said at least one sector being generally unreadable.

64. A DVD encoder comprising:

25 means for invalidating an ECC block.

65. The DVD encoder according to claim 64 wherein said means for invalidating an ECC block comprises:

means for invalidating an outer parity symbols (P0);

means for invalidating an inner parity symbols (PI); and

30 means for replacing a data symbol.